DECLARATION

I, Gerald Isaac Serenje, hereby declare that the work presented in this dissertation was my own and has never been submitted for a degree at this or any other University.

Signature…………………………….

Date………………………………...

APPROVAL

This dissertation of **GERALD ISAAC SERENJE** is approved as fulfilling part of the requirements for the award of the degree of Masters of Science in Plant Breeding and Seed Systems by the University of Zambia.

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DEDICATION

To my wonderful family and friends, and especially to my mother, Susan Phiri, for supporting me throughout my studies.

ACKNOWLEDGEMENT

I would like to thank the University of Zambia, School of Agricultural Sciences, staff and the other students of the Department of Crop Sciences for helping to make my time here such a good and rewarding experience. In particular, I thank Dr.S. M. Mwala for being such an excellent, patient supervisor, and Dr. M. Chiona of Mansa Research for supervising the trials. I would also like to acknowledge SADC/ICART for the financial support of this study.

ABSTRACT

Sweetpotato is one of the most important sources of carbohydrates among small-scale farmers in Zambia and ranking second only to cassava. A study was conducted under field conditions at three locations during the 2008/09 season to determine the variability of micronutrients and to characterise the agronomic parameters of orange-fleshed sweetpotato varieties grown under different environments. The experiments were laid out and evaluated in a RCBD with 3 replications. A total of 15 varieties, including 2 local varieties, were used.

The results showed that there were significant differences in the locations for zinc with highest content obtained at Kamato with 44 mg/100g followed by Mansa with 27 mg/100g and lastly 12.8 mg/100g at Mutanda, while varieties were significantly different (P=0.05) for iron. There was differential response of the varieties to the locations with regards to iron. Naspot1 and Ukerewe had the highest iron concentration at 11.20 mg/100g and 8.06 mg/100g. It was also revealed that locations, varieties and interactions were significantly different (P=0.05) for ß-carotene and vitamin A concentrations of sweetpotato. The variety Zambezi, K5 632, 199062.1 and Mayai produced high mean concentration of ß-carotene. These were 7.82 mg/100g, 7.89 mg/100g, 6.18 mg/100g and 6.52 mg/100g, respectively.

The varieties with high total plant yield were Naspot1 and 199062.1 with 21.88 t/ha and 19.78 t/ha respectively, while the varieties with the total plant weight was Kakamega with 7.15 t/ha. Mutanda had the highest mean total plant weight of 16.7 t/ha, while Kamato and Mansa had 13.7 t/ha and 13.2 t/ha respectively. For marketable yield, locations and varieties were significantly different at P=0.05. The varieties with the highest marketable yield were Naspot1 and K118 at 13.7 t/ha and 9.57 t/ha, respectively. The variety with the lowest marketable y ld was Kakamega at 5.23 t/ha. The mean marketable yield for locations ranged from 5.23 t/ha at Mansa to 9.69 t/ha at Mutanda. The results for non marketable yield showed that locations, varieties and interactions were significantly different at P=0.05.The highest non marketable yield varieties were Kalungwishi and 199062.1 with 7.26 t/ha and 5.50 t/ha respectively. There was a differential response in non-marketable yield for varieties tested as evidenced by interactions. None of the high yielding varieties showed high levels of stability.
Varieties were also significantly different for weevil score, vine weight and harvest index. The variety with the highest weevil score was Carrot.C at 2.62 while the variety with the lowest weevil score was Naspot1 at 1.31. The varieties with high vine weight were K118 and Gweri at 4.52 t/ha and 4.29 t/ha, respectively while Ejumula had the lowest vine weight with 1.94 t/ha. The varieties with high harvest index were 199062.1, Carrot.C and Mayai at 85%, 83% and 83% respectively. Gweri, Kakamega and Pipi had the lowest HI with values of 67%, 68% and 70%, respect ly.

From the current study it can be concluded that selection for high yielding orange-fleshed sweetpotato varieties for the varying environments is feasible though identification of superior varieties in terms of zinc and iron will require use of large samples of materials tested over a number of seasons and preferably over a number of locations.

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